REMARKS

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

Claims 1-6, 8-10 and 12-18 are pending in the application. Claims 1-6, 8-10 and 12-18 stand rejected.

Objections To The Claims

Claims 12-14 are objected to by the Examiner for being dependent upon a cancelled claim 11.

The dependency of claims 12-14 have been amended to claim 15 to alleviate the Examiner's objection.

Claim Rejections Under 35 USC §103

Claims 1-5, 8-10 and 12-18 are rejected under 35 USC §103(a) as being unpatentable over Pant et al. It is contended that Pant discloses a linear CMP apparatus equipped with a programmable pneumatic support platen including a wafer carrier, a continuous belt, a motor means, a support platen which has a plurality of apertures. It is further contended that Pant et al teaches all the limitations of the claims except for the plurality

of openings having different diameters, each of the plurality of openings having a diameter of about 0.1 mm to 10 mm, and the gas being nitrogen.

The rejection of claims 1-5, 8-10 and 12-18 under 35 USC §103(a) based on Pant et al is respectfully traversed.

Independent claim 1 narrowly recites the present invention as:

> "Claim 1. A linear chemical mechanical polishing apparatus equipped with a programmable pneumatic support platen comprising:
>
> a wafer carrier for holding and rotating a wafer ...;
>
> a continuous belt ...;
>
> a motor means ...; and
>
> a support platen ... having a predetermined thickness, **a plurality of apertures therethrough and a plurality of openings in a top surface ... said plurality of openings having different diameters.**"

The Applicants respectfully submit that a support platen that is equipped with a plurality of openings that have different diameters in a top surface is not taught or disclosed by Pant et

al. The Applicants further submit that such use of a plurality of openings that have different diameters affords a much wider control of the pressurizing condition by pre-programming, and such is not a mere "discovering the optimum or workable ranges", as alleged by the Examiner.

Pant et al discloses a technique for controlling a polishing rate across a substrate surface when performing CMP including the use of a support housing with a plurality of openings for dispensing a pressurized fluid. (Abstract) The openings of Pant are configured into a number of groupings, in which a separate channel is used for each grouping so that fluid pressure for each group of openings can be separately and independently controlled. These separate groupings of openings are shown by Pant in Figs. 3, 5, 8-10 and 12. For instance, at col. 5, lines 7-12:

> "within the center section 30, a series of openings 31 are formed, arranged in parallel rows 32. In the embodiment of Figs. 3-4, the rows are disposed in the direction of belt travel (rows are parallel to direction 16). For each row 32 of openings 31, a fluid channel 33 or 34 is disposed under the opening 31. Channel 33 is a dispensing channel for dispensing a pressurized fluid."

Again, at col. 5, lines 51-60:

"the degree of control and adjustments available will depend on a number of factors, including the number of channels 33, the number and size of openings 31, linear speed of the belt, rotational speed of the wafer, height of the active center section 30, platen height, platen alignment and particularly the flow rate and pressure of the fluid being dispensed. In the embodiment shown in Figs.3-4, **the opening 31 are approximately 0.020 inch in diameter** and coupled to channels, each of which are formed from a 1/4 inch diameter tubing".

The Applicants respectfully submit that Pant does not teach or disclose a support platen that has a plurality of openings formed in a top surface in which the plurality of openings have different diameters.

Furthermore, the Applicants have clearly shown the criticality for the use of a plurality of openings that have different diameters in the specification, such as at page 24, paragraph 0050:

> "the plurality of openings 86 on each of the concentric circles forms a separate zone of control for the pneumatic pressure. ... Each of the plurality of openings 86 may have a diameter between about 0.1 mm and about 10 mm, and preferably a diameter between about 1mm and about 5 mm, ..."

The Applicants therefore respectfully submit that recognizing the use of a plurality of openings with different diameters is beyond that of a mere design choice or a discovering of optimum or workable ranges.

The rejection of claims 1-5 and 8-10 under 35 USC §103(a) based on Pant et al is respectfully traversed.

Independent claim 15, onto which claims 12-14 and 16-18 depend, recites the specific process steps of:

> "Claim 15. A method for controlling the polishing profile on a wafer surface during a linear (CMP) process comprising the steps of:

providing a linear CMP apparatus comprising ...;

rotating said continuous belt in a predetermined direction;

engaging said first surface of the wafer ...;

flowing a gas flow through said plurality of apertures ...;

detecting a pressure of gas flow through a preselected zone incorporating a preselected plurality of openings and sending a first signal to a process controller;

comparing said first signal with a pre-stored value in the process controller and sending a second signal to a flow regulator responsive to said preselected zone; and

altering said pressure of said gas flow responsive to said second signal until said first signal substantially equals to said pre-stored value in the process controller."

The Applicants respectfully submit that such process steps, indicative of a closed-loop control process, are clearly not taught or disclosed by Pant et al. The rejection of claims 12-18

under 35 USC §103(a) based on Pant et al is respectfully traversed. A reconsideration for allowance of these claims is respectfully requested of the Examiner.

Based on the foregoing, the Applicants respectfully submit that all of the pending claims, i.e. claims 1-6, 8-10 and 12-18, are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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